

Appellants' Brief on Appeal  
U.S. Application Serial No. 09/987,404



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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of

Takeshi Kamio, et al.

Serial No.: 09/987,404

Group Art Unit: 1731

Filed: November 14, 2001

Examiner: John M. Hoffman

For: METHOD FOR SINTERING POROUS-GLASS MATERIAL, AND  
METHOD FOR MANUFACTURING PREFORM AND OPTICAL FIBER

**AMENDED APPELLANTS' BRIEF ON APPEAL**

Honorable Commissioner of Patents  
Alexandria, Virginia 22313-1450  
Box AF

Sir:

Further to the Appeal Brief filed on December 28, 2007, and in response to the Notification of Non-Compliant Appeal Brief dated January 23, 2008, Appellants submit an Amended Appellant's Brief on Appeal.

Appellants respectfully appeal the final rejection of claims 1, 3-8, 10-15, 17, and 21-25 in the Final Office Action dated August 1, 2007. A Notice of Appeal was timely filed on November 1, 2007.

**I. REAL PARTY IN INTEREST**

The real party in interest is Shin-Etsu Chemical Co., Ltd., assignee of 100% interest of the above-referenced patent application.

## **II. RELATED APPEALS AND INTERFERENCES**

There are no other appeals or interferences known to Appellants, Appellants' legal representative, or Assignee, which would directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

## **III. STATUS OF CLAIMS**

Claims 1, 3-8, 10-15, 17, and 21-25 are all of the claims pending in the Application. Claims 2, 9, 16, and 18-20 were previously canceled and are no longer pending in the Application. Claims 1, 3-8, 10-15, 17, and 21-25, all of the claims involved in the appeal, are set forth fully in the attached Appendix.

Claims 1, 3-7, and 21-25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishikawa (U.S. Patent No. 5,306,322). Claims 8, 10-15, and 17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishikawa in view of Antos (U.S. Patent No. 6,289,698).

Appellants respectfully appeal the rejections of claims 1, 3-7, and 21-25 under 35 U.S.C. § 103(a) as being unpatentable over Ishikawa and claims 8, 10-15, and 17 under 35 U.S.C. § 103(a) as being unpatentable over Ishikawa in view of Antos, which are the sole issues in this Appeal.

## **IV. STATUS OF AMENDMENTS**

An Amendment under 37 C.F.R. § 1.111 was filed on July 23, 2007. The claims were amended in the Amendment. The claims in the Appendix reflect the version of the claims in the Amendment under 37 C.F.R. § 1.111 submitted on July 23, 2007.

The Examiner issued a Final Office Action on August 1, 2007, rejecting claims 1, 3-8, 10-15, 17, and 21-25.

A Notice of Appeal was timely filed on November 1, 2007.

Therefore, the claims are pending as set forth in the Appendix.

## **V. SUMMARY OF THE CLAIMED SUBJECT MATTER**

Appellants point out that reference numbers, figure numbers, and references to passages in the Specification used in this section, and other sections, of the Appeal Brief are provided merely for the benefit of the Board and for meeting the requirements set forth in 37 C.F.R. § 41.37(c)(v) and are not meant to limit the scope of the claimed invention in any manner.

### **INDEPENDENT CLAIM 1**

The claimed invention, as set forth in exemplary claim 1, is directed to a method for sintering a porous-glass material, having a core inside the porous-glass material, in a furnace to form a glass base material, which is a base material for an optical fiber (e.g., see Application at page 3, lines 18-27, page 11, line 30 through page 13, line 7, and Figure 3). The method includes preparing a ring heater having an opening, the opening having an inner diameter (D), through which the porous-glass material passes, for heating the porous-glass material (e.g., see Application at page 3, lines 8-27), preparing the porous-glass material having an outer diameter (d) (e.g., S10; see Application at Figure 3, page 11, lines 30-33), putting the porous-glass material, formed by performing the preparing the porous-glass material, in the furnace (e.g., S14; see Application at Figure 3, page 12, line 10), and heating the porous-glass material in an atmosphere of dehydration gas and inert gas with the ring

heater (e.g., S16-S20; see Application at Figure 3, page 12, lines 11-34). The outer diameter(d) of the porous-glass material is within a range of  $0.5xD < d < 0.9xD$  (e.g., see Application at page 11, lines 25-28).

### **INDEPENDENT CLAIM 8**

The claimed invention, as set forth in exemplary claim 8, is directed to a method for manufacturing a preform, which is a base material of an optical fiber, in a furnace (e.g., see Application at page 4, lines 13-24, page 11, line 30 through page 13, line 7, and Figure 3). The method includes preparing a ring heater having an opening, the opening having an inner diameter (D), through which a porous-glass material, having a core inside the porous-glass material, which is a base material of the preform, passes, for heating the porous-glass material (e.g., see Application at page 4, lines 13-24), forming the porous-glass material having an outer diameter (d) (e.g., S10; see Application at Figure 3, page 11, lines 30-33), putting the porous-glass material, formed by performing the forming the porous-glass material, in the furnace (e.g., S14; see Application at Figure 3, page 12, line 10), sintering the porous-glass material in an atmosphere of dehydration gas and inert gas with the ring heater (e.g., S16-S20; see Application at Figure 3, page 12 line 30 through page 13, line 3), and elongating the sintered porous-glass material to form the preform (e.g., see Application at page 4, lines 13-24), wherein the outer diameter (d) of the porous-glass material is within a range of  $0.5xD < d < 0.9xD$  (e.g., see Application at page 11, lines 25-28).

**INDEPENDENT CLAIM 15**

The claimed invention, as set forth in exemplary claim 15, is directed to a method for manufacturing an optical fiber in a furnace(e.g., see Application at page 5, lines 10-21, page 11, line 30 through page 13, line 7, and Figure 3). The method includes preparing a ring heater having an opening, the opening having an inner diameter (D), through which a porous-glass material, having a core inside the porous-glass material, which is a base material of the optical fiber, passes, for heating the porous-glass material (e.g., see Application at page 5, lines 10-21), forming the porous -glass material having an outer diameter (d) (e.g., S10; see Application at Figure 3, page 11, lines 30-33), putting the porous-glass material, formed by performing the forming the porous-glass material, in the furnace (e.g., S14; see Application at Figure 3, page 12, line 10), sintering the porous-glass material in an atmosphere of dehydration gas and inert gas with the ring heater (e.g., S16-S20; see Application at Figure 3, page 12 line 30 through page 13, line 3), elongating the sintered porous-glass material to form a preform (e.g., see Application at page 5, lines 10-21), and drawing the preform to form the optical fiber(e.g., see Application at page 5, lines 10-21). The outer diameter (d) of the porous-glass material material is within a range of  $0.5 \times D < d < 0.9 \times D$  (e.g., see Application at page 11, lines 25-28).

The non-obvious and unique combination of features allows the claimed invention to ensure uniform vitrification in the radial direction of the porous-glass material (see Application at page 9, lines 30-33).

Each of the features recited in dependent claims 3-7, 10-14, 17, 21-25 are described in detail in the Specification (e.g., see pages 6-19) and Figures 1-5 of the Application.

## **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

The issues presented for review by the Board of Patent Appeals and Interferences are whether claims 1, 3-7, and 21-25 are unpatentable under 35 U.S.C. § 103(a) over Ishikawa, and whether claims 8, 10-15, and 17 are unpatentable under 35 U.S.C. § 103(a) over Ishikawa in view of Antos.

## **VII. ARGUMENT**

### **A. THE EXAMINER'S POSITION**

In the Final Office Action dated August 1, 2007, the Examiner rejected claims 1, 3-7, and 21-25 as being unpatentable under 35 U.S.C. § 103(a) over Ishikawa. Furthermore, in the Final Office Action dated August 1, 2007, the Examiner rejected claims 8, 10-15, and 17 as being unpatentable under 35 U.S.C. § 103(a) over Ishikawa in view of Antos.

In the Final Office Action dated August 1, 2007, the Examiner maintained that “*it would have been obvious to use as big or as small a preform as desired – depending on how much fiber one wishes to make.*” (See Office Action dated August 1, 2007 at page 4).

### **B. APPELLANT'S POSITION**

To summarize, Appellant submits that the Examiner's position is flawed as a matter of fact and law. Thus, claims 1, 3-7, and 21-25 are not unpatentable over Ishikawa and claims 8, 10-15, and 17 are not unpatentable over Ishikawa in view of Antos.

i) **Claims 1, 3-7, and 21-25 are not unpatentable over Ishikawa.**

1. **INDEPENDENT CLAIM 1**

a. **The Examiner's Position is Flawed as a Matter of Fact  
and Law.**

The Examiner alleged that the claimed invention of claims 1, 3-7, and 21-25 would have been obvious in view of Ishikawa. Appellants submit, however, that there are features of the claimed invention that are not taught nor suggested by Ishikawa.

That is, Ishikawa does not teach or suggest that "*said predetermined range of said outer diameter ( $d$ ) of said porous-glass material is within  $0.5xD < d < 0.9xD$* ", as recited in exemplary claim 1 (and similarly recited in claims 8 and 15 discussed below).

The Examiner does not even allege that Ishikawa teaches or suggests this feature of the claimed invention. Indeed, the Examiner conceded that Ishikawa teaches a ratio of  $d/D = 0.93$ , which is outside of the claimed range. The Examiner, however, alleges that the claimed range would have been obvious in view of Ishikawa.

Appellants have previously submitted two declarations under 37 C.F.R. § 1.132 to establish the criticality of the range recited in the claimed invention and thus rebut the Examiner's alleged *prima facie* case of obviousness (Appellants maintain that since the ratio taught in Ishikawa is outside of the claimed range, the Examiner has not established a *prima facie* case of obviousness).

In order to clearly verify the evidence that unexpected results are obtained by using a ratio ( $d/D$ ) of  $0.5 < d/D < 0.9$ , Appellants submitted two graphs (Graph 1 and Graph 2) regarding test results submitted in Declarations under 37 C.F.R. § 1.132. Graph 1 is a line graph with ratio ( $d/D$ ) on the horizontal axis and eccentricity error on the vertical axis, while Graph 2 is a

bar graph with ratio ( $d/D$ ) on the horizontal axis and number of test pieces of which a surface was damaged on the vertical axis (Graph 1 graphically illustrates the data included in Declaration under 37 C.F.R. § 1.132 submitted on December 7, 2006; Graph 2 graphically illustrates the data included in the Declaration under 37 C.F.R. § 1.132 submitted on July 19, 2006).

As clearly illustrated in Graph 1, in the case that  $d/D$  exceeds 0.5, the eccentricity error is significantly decreased. Accordingly, Appellants submit that the claimed range ( $0.5 < d/D$ ) obtains unexpected results.

Furthermore, as shown in Graph 2, in the case that  $d/D$  exceeds 0.9, the number of test pieces (glass base material) of which a surface is damaged is increased. Accordingly, Appellants submit that the claimed range ( $d/D < 0.9$ ) obtains unexpected results.

The Examiner, in the Response to Arguments section of the Office Action dated March 22, 2007, alleged that Appellants have not provided any evidence to support the above arguments that the range recited in the claimed invention is significant and unexpected. The Examiner, however, is clearly incorrect.

That is, the M.P.E.P. clearly sets forth: "Evidence of unexpected properties may be in the form of a direct or indirect comparison of the claimed invention with the closest prior art which is commensurate with the claims." (See M.P.E.P. § 716.02 (b, e)).

In the two Declarations under 37 C.F.R. § 1.132, Appellants provided a comparison of the claimed invention to the closest prior art, Ishikawa.

Indeed, test subjects No. 1 and No. 2 are within the claimed range while No. 3 ( $d/D = 0.93$ ) is the ratio of Ishikawa (e.g., see Graph 2). Accordingly, Appellants provided a



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comparison of the claimed invention and the closest prior art, as set forth in M.P.E.P. § 716.02 (b, e)).

During a personal interview with the Examiner, conducted on July 11, 2007 and summarized below, the Examiner indicated that he was not aware of and did not consider M.P.E.P. § 716.02 (b, e)) when reviewing the Declarations.

Appellants respectfully requested the Examiner to consider M.P.E.P. § 716.02 when reviewing the Declarations as M.P.E.P. § 716.02 controls the present issue.

Appellants submit that since they have clearly provided evidence in accordance with M.P.E.P. § 716.02 (b, e), Appellants have clearly met their burden in rebutting the Examiner's allegations regarding obviousness.

Moreover, Appellants submit that Ishikawa discloses a synthetic silica glass manufacturing method. A feature of the method is to manufacture a synthetic silica glass in a furnace under a heat treatment of an atmosphere including an inert gas and silicon tetrachloride ( $\text{SiCl}_4$ ) gas. Thus, the synthetic silica gas containing neither moisture nor impurities can be manufactured. Specifically, Ishikawa fails to teach or suggest a ratio of (d/D) and (d/L), together with an eccentricity error of the core as recited in the claimed invention and as evidenced in the Declarations submitted under 37 C.F.R. 1.132.

In the Response to Arguments section of the Office Action dated March 22, 2007, the Examiner erroneously alleged, "it is further argued that Ishikawa fails to teach or suggest a ratio together with an eccentricity error of the core as recited in the claimed invention. Examiner does not understand this argument. The claims do not limit any error." (See Office Action dated March 22, 2007 at page 5). The Examiner, however, is clearly incorrect. The combination of features referred to by the Examiner is clearly recited in exemplary claim 6.

Appellants point out that the Examiner must consider all of the pending claims, not just the independent claims.

In the Response to Arguments section of the Office Action dated August 1, 2007, the Examiner alleged, "*it would have been obvious to use as big or as small a preform as claimed – depending on how much fiber one wants to make.*" (See Office Action dated August 1, 2007 at page 4).

Appellants submit, however, that the claimed invention does not merely recite a "size" of the preform. Indeed, the claimed invention recites a specific relationship of the outer diameter of the preform to the inner diameter of the ring heater.

Furthermore, the Examiner alleged, "*Applicant refers to two graphs. It is unclear what graphs applicant is referring to. Examiner could only find one graph in the application file.*" (See Office Action dated August 1, 2007 at page 4). The Examiner, however, is clearly incorrect.

That is, on February 7, 2007, Appellants submitted an executed copy of a Declaration under 37 C.F.R. § 1.132 (the original Declaration submitted on December 7, 2006 was unexecuted) with a second copy of each of Graph 1 and Graph 2 (as evidenced by the enclosed United States Patent and Trademark Office dated-stamped filing receipt). In the event the Examiner has misplaced one of Graph 1 and Graph 2, Appellants have submitted a third copy of each of Graph 1 and Graph 2 for the record.

Appellants submit that Graph 1 and Graph 2 were entered into the record on February 7, 2007, as clearly evidenced by the enclosed United States Patent and Trademark Office dated-stamped filing receipt. Appellants, however, point out (as was previously pointed out to the Examiner) that Graph 1 graphically illustrates the data included in

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Declaration under 37 C.F.R. § 1.132 submitted on December 7, 2006; Graph 2 graphically illustrates the data included in the Declaration under 37 C.F.R. § 1.132 submitted on July 19, 2006. Accordingly, even without reference the Graph 1 and Graph 2, the Examiner would have been presented with all of the presented data.

The Examiner additionally alleged that the Declaration under 37 C.F.R. § 1.132 was unsigned (see Office Action dated August 1, 2007 at page 4). Appellants point out (as was previously pointed out to the Examiner) that a Declaration under 37 C.F.R. § 1.132, with Graph 1 and Graph 2, was filed on December 7, 2006. Subsequently, a executed copy of the Declaration under 37 C.F.R. § 1.132, filed on December 7, 2006, was filed on February 7, 2007.

The test data table submit in the Declaration filed on July 19, 2006, and recreated below, verifies that a surface of the porous-glass material was not damaged in the case where  $d/D < 0.9$  (test numbers 1 and 2). Specifically, in the test results shown in the table, a judgment of acceptance depends upon whether or not even one of 50 test pieces (porous-glass material) was damaged. Accordingly, test numbers 1 and 2 ( $d/D < 0.9$ , namely, claimed range) are accepted.

In stark contrast, test numbers 3 and 4 ( $d/D > 0.9$ , namely, out of the claimed range) are not excepted. This evidence is a reason why the results of the claimed range ( $d/D < 0.9$ ) are truly important and truly unexpected.

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Test No.	d (mm)	D (mm)	D/D	Number of test pieces of which surface was not damaged.	Number of test pieces of which surface was damaged.	Number of test pieces caused damage to the furnace.
1	350	400	0.88	50	0	0
2	360	400	0.90	50	0	0
3	370	400	0.93	34	16	0
4	380	400	0.95	0	50	3

Furthermore, Appellants submitted the second Declaration on December 7, 2006 (an executed version was submitted on February 7, 2007) providing further evidence of the importance and unexpected results of the claimed invention. In accordance with the test results shown in the table in the Declaration filed on December 7, 2006 (and reproduced below), a glass base material having a low eccentricity error of a core, the value of which is 0.3% or below, can be manufactured in the case where  $d/D > 0.5$  (test numbers 1 to 7, namely, claimed range). On the other hand, in the case where  $d/D < 0.5$  (test numbers 8 and 12, namely, out of claimed range), a glass base material having a relatively high eccentricity error of core is manufactured.

Appellants submit that this evidence supports the description at page 10, line 32 to page 11, line 3 of the specification as filed, such that the predetermined range of the outer

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diameter (d) of the porous-glass material may be determined so that an eccentricity error of a core inside of the glass base material manufactured by sintering the porous-glass material (e.g., 12) becomes 0.4% of less.

Test No.	d (mm)	D (mm)	L (mm)	d/D (-)	d/L (-)	Eccentricity error (%)
1	320	400	400	0.800	0.800	0.15
2	280	400	400	0.700	0.700	0.24
3	260	400	400	0.650	0.650	0.30
4	240	400	400	0.600	0.600	0.29
5	220	400	400	0.550	0.550	0.28
6	210	400	400	0.525	0.525	0.29
7	200	400	400	0.500	0.500	0.30
8	190	400	400	0.475	0.475	0.43
9	180	400	400	0.450	0.450	0.75
10	170	400	400	0.425	0.425	0.71
11	160	400	400	0.400	0.400	0.78
12	150	400	400	0.375	0.375	0.83

Accordingly, Appellants submit that claimed invention, including the claimed range ( $0.5 < d/D < 0.9$ ), can clearly provide tremendous advantages such that a glass base material

having a low eccentricity error of a core can be manufactured, and the porous-glass material may not contact with a sidewall of a furnace so that the porous-glass material is not damaged.

Moreover, with respect to the Examiner's position in the Response to Arguments (e.g., see Office Action dated September 7, 2006 at page 6, lines 1-8), Appellants submit that the claimed range ( $0.5 < d/D < 0.9$ ) of the claimed invention facilitates a design of a porous-glass material sintering apparatus (e.g., 10; see Figure 5 of Application). Specifically, a size of a diameter (D) of a ring heater (e.g., 9), which is suitable for a size of a diameter (d) of the porous-glass material (e.g., 2) can be calculated based on the claimed range (d/D) to prevent the porous-glass material (e.g., 2) from contacting with the sidewall of the furnace (e.g., 5) ( $d/D < 0.9$ ), and to prevent an eccentricity error of the glass base material from increasing ( $d/D > 0.5$ ).

Thus, the apparatus (e.g., 10) can be miniaturized under the condition that a clearance between the porous-glass material (e.g., 2) and the sidewall of the furnace (e.g., 5) become smaller as much as possible. Accordingly, the claimed range (d/D) of the present invention was not accidentally obtained, but was obtained by performing tests to find out a suitable range capable of preventing the porous-glass material from contacting with the sidewall of the furnace, and capable of preventing an eccentricity error of the glass base material from increasing. Based upon this concept, Appellants submit that the Examiner's position is erroneous.

Therefore, Appellants respectfully submit that the range recited in claim 1 (and similarly recited in claims 8 and 15) is clearly important and has not been arbitrarily selected as alleged by the Examiner and indeed has provided unexpectedly superior results over the closest prior art of record.

Accordingly, even assuming that Ishikawa may disclose a synthetic silica glass manufacturing method that is somewhat similar to a method for sintering a porous glass material of the claimed invention, Applicants submit that the claimed ranges of the claimed invention would not have been obvious in view of Ishikawa (taken alone or in combination with Antos).

Therefore, Appellants respectfully submit that the Examiner's position is clearly unreasonable.

**2. DEPENDENT CLAIMS 3-7 and 21-25**

**a. The Examiner's Position is Flawed as a Matter of Fact and Law.**

Dependent claims 3, 4, 5, 6, 7, 21, 22, 23, 24, and 25 depend from independent claim 1, and further define the claimed invention.

Specifically, claim 3 recites, "*wherein said outer diameter ( $d$ ) of said porous-glass material is within a range of  $0.6xD \leq d \leq 0.8xD$* ". This feature is not taught or suggested by the cited references.

Furthermore, claim 4 recites, "*wherein said ring heater has a vertical length ( $L$ )*". This is not taught or suggest by the cited references.

Furthermore, claim 5 recites, "*wherein said outer diameter ( $d$ ) of said porous-glass material is within a range of  $0.5xL \leq d \leq 0.9xL$* ". This feature is not taught or suggest by the cited references.

Furthermore, claim 6 recites, "*wherein an eccentricity error of a core inside a glass base material manufactured by sintering said porous-glass material is substantially 0.4 % or*

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*less*". This feature is not taught or suggested by the cited references.

Furthermore, claim 7 recites, "*wherein said heating heats said porous-glass material in said furnace that is provided inside said opening of said ring heater so that a part of said furnace is surrounded by said ring heater*". This feature is not taught or suggested by the cited references.

Furthermore, claim 21 recites, "*wherein said dehydration gas comprises chlorine*". This feature is not taught or suggested by the cited references.

Furthermore, claim 22 recites, "*wherein said inert gas comprises helium*". This feature is not taught or suggested by the cited references.

Furthermore, claim 23 recites, "*wherein said dehydration gas comprises chlorine and said inert gas comprises helium*". This feature is not taught or suggested by the cited references.

Furthermore, claim 24 recites, "*further comprising: descending said porous-glass material to a bottom of said furnace*". This feature is not taught or suggested by the cited references.

Furthermore, claim 25 recites, "*further comprising: rotating said porous-glass material in said furnace*". This feature is not taught or suggested by the cited references.

Therefore, dependent claims 3-7 and 21-25, like independent claim 1, include at least one element, which is not taught or suggested by the alleged combination of Ishikawa.

Therefore, Appellant respectfully submits that the Examiners' position is clearly unreasonable.



ii) **Claims 8, 10-15 and 17 are not unpatentable over Ishikawa in view of Antos.**

**1. INDEPENDENT CLAIMS 8 and 15**

**b. The Examiner's Position is Flawed as a Matter of Fact and Law.**

The Examiner alleged that the claimed invention of claims 8, 10-15 and 17 would have been obvious in view of the alleged combination of Ishikawa in view of Antos. Appellants submit, however, that there are features of the claimed invention that are not taught nor suggested by any the cited references (taken alone or in combination).

That is, neither Ishikawa nor Antos, nor any combination thereof, teaches or suggests that “*said predetermined range of said outer diameter (d) of said porous-glass material is within  $0.5xD < d < 0.9xD$* ” as recited in claim 1 and similarly recited in claims 8 and 15.

The Examiner does not even allege that Ishikawa nor Antos teaches or suggests this feature of the claimed invention. Indeed, as detailed above in section i), Ishikawa fails to teach or suggest this feature of the claimed invention.

Furthermore, Appellants submit that Antos fails to make up the deficiencies of Ishikawa. Indeed, the Examiner does not even allege that Antos teaches or suggests that the predetermined range of the outer diameter (d) of the porous-glass material is within  $0.5xD < d < 0.9xD$ .

Therefore, Appellants respectfully submit that the Examiner's position is clearly unreasonable.

**2. DEPENDENT CLAIMS 10, 11, 12, 13, 14, and 17**

**b. The Examiner's Position is Flawed as a Matter of Fact and Law.**

Dependent claims 10, 11, 12, 13, 14, and 17 depend from independent claims 8, 8, 11,, 8, 8, 15, respectively, and further define the claimed invention.

Specifically, claim 10 recites, "*wherein said outer diameter ( $d$ ) of said porous-glass material is within a range of  $0.6xD \leq d \leq 0.8xD$* ". This feature is not taught or suggested by the cited references.

Furthermore, claim 11 recites, "*wherein said ring heater has a vertical length ( $L$ )*". This feature is not taught or suggested by the cited references.

Furthermore, claim 12 recites, "*wherein said outer diameter ( $d$ ) of said porous-glass material is within a range of  $0.5xL \leq d \leq 0.9xL$* ". This feature is not taught or suggested by the cited references.

Furthermore, claim 13 recites, "*wherein an eccentricity error of a core inside said sintered porous-glass material is substantially 0.4 % or less*". This feature is not taught or suggested by the cited references.

Furthermore, claim 14 recites, "*wherein said heating heats said porous-glass material in a furnace that is provided inside said opening of said ring heater so that a part of said furnace is surrounded by said ring heater*". This feature is not taught or suggested by the cited references.

Furthermore, claim 17 recites, "*wherein said outer diameter ( $d$ ) of said porous-glass material comprises substantially  $0.6xD \leq d \leq 0.8xD$* ". This feature is not taught or suggested by the cited references.

Therefore, dependent claims 10, 11, 12, 13, 14, and 17, like independent claims 8 and 15, include at least one element, which is not taught or suggested by the alleged combination of Ishikawa and Antos.

Therefore, Appellant respectfully submits that the Examiners' position is clearly unreasonable.

#### **VIII. CONCLUSION**

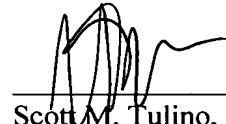
In view of the foregoing, Appellant submits that claims 1, 3-8, 10-15, 17, and 21-25, all of the claims presently pending in the application, are patentably distinct from the prior art of record and in condition for allowance. Thus, the Board is respectfully requested to remove the rejections of claims 1, 3-8, 10-15, 17, and 21-25.

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paper to Attorney's Deposit Account number 50-0481.

Date: Feb 25, 2008

Respectfully Submitted,



\_\_\_\_\_  
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**CLAIMS APPENDIX**

1. A method for sintering a porous-glass material, having a core inside the porous-glass material, in a furnace to form a glass base material, which is a base material for an optical fiber, comprising:

preparing a ring heater having an opening, said opening having an inner diameter (D), through which said porous-glass material passes, for heating said porous-glass material;

preparing said porous-glass material having an outer diameter (d);

putting said porous-glass material, formed by performing said preparing said porous-glass material, in the furnace; and

heating said porous-glass material in an atmosphere of dehydration gas and inert gas with said ring heater,

wherein said outer diameter(d) of said porous-glass material is within a range of  $0.5xD < d < 0.9xD$ .

3. A method as claimed in claim 1, wherein said outer diameter (d) of said porous-glass material is within a range of  $0.6xD \leq d \leq 0.8xD$ .

4. A method as claimed in claim 1, wherein said ring heater has a vertical length (L).

5. A method as claimed in claim 4, wherein said outer diameter (d) of said porous-glass material is within a range of  $0.5xL \leq d \leq 0.9xL$ .

6. A method as claimed in claim 1, wherein an eccentricity error of a core inside a glass base material manufactured by sintering said porous-glass material is substantially 0.4 % or less.

7. A method as claimed in claim 1, wherein said heating heats said porous-glass material in said furnace that is provided inside said opening of said ring heater so that a part of said furnace is surrounded by said ring heater.

8. A method for manufacturing a preform, which is a base material of an optical fiber, in a furnace, comprising:

preparing a ring heater having an opening, said opening having an inner diameter (D), through which a porous-glass material, having a core inside said porous-glass material, which is a base material of said preform, passes, for heating said porous-glass material;

forming said porous-glass material having an outer diameter (d);

putting said porous-glass material, formed by performing said forming said porous-glass material, in the furnace;

sintering said porous-glass material in an atmosphere of dehydration gas and inert gas with said ring heater; and

elongating said sintered porous-glass material to form said preform,

wherein said outer diameter (d) of said porous-glass material is within a range of  $0.5xD < d < 0.9xD$ .

10. A method as claimed in claim 8, wherein said outer diameter (d) of said porous-glass material is within a range of  $0.6xD \leq d \leq 0.8xD$ .
11. A method as claimed in claim 8, wherein said ring heater has a vertical length (L).
12. A method as claimed in claim 11, wherein said outer diameter (d) of said porous-glass material is within a range of  $0.5xL \leq d \leq 0.9xL$ .
13. A method as claimed in claim 8, wherein an eccentricity error of a core inside said sintered porous-glass material is substantially 0.4 % or less.
14. A method as claimed in claim 8, wherein said heating heats said porous-glass material in a furnace that is provided inside said opening of said ring heater so that a part of said furnace is surrounded by said ring heater.
15. A method for manufacturing an optical fiber in a furnace, comprising:
  - preparing a ring heater having an opening, said opening having an inner diameter (D), through which a porous-glass material, having a core inside said porous-glass material, which is a base material of said optical fiber, passes, for heating said porous-glass material;
  - forming said porous -glass material having an outer diameter (d);
  - putting said porous-glass material, formed by performing said forming said porous-glass material, in the furnace;

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U.S. Application Serial No. 09/987,404

sintering said porous-glass material in an atmosphere of dehydration gas and inert gas with said ring heater; and

elongating said sintered porous-glass material to form a preform; and

drawing said preform to form said optical fiber,

wherein said outer diameter (d) of said porous-glass material material is within a range of  $0.5xD < d < 0.9xD$ .

17. A method as claimed in claim 15, wherein said outer diameter (d) of said porous-glass material comprises substantially  $0.6xD \leq d \leq 0.8xD$

21. A method as claimed in claim 1, wherein said dehydration gas comprises chlorine.

22. A method as claimed in claim 1, wherein said inert gas comprises helium.

23. A method as claimed in claim 1, wherein said dehydration gas comprises chlorine and said inert gas comprises helium.

24. A method as claimed in claim 1, further comprising:  
descending said porous-glass material to a bottom of said furnace.

25. A method as claimed in claim 1, further comprising:  
rotating said porous-glass material in said furnace.



**EVIDENCE APPENDIX**

- 1) Copy of executed Declaration under 37 C.F.R. § 1.132 filed on July 19, 2006.  
Appellants submit that the Declaration was entered into the record on July 19, 2006 and was addressed by the Examiner in the Office Action dated September 7, 2006 (see page 5 of Office Action dated September 7, 2006).
- 2) Copy of executed Declaration under 37 C.F.R. § 1.132 filed on February 7, 2007, and copies of Graph 1 and Graph 2 submitted with the executed Declaration under 37 C.F.R. § 1.132. Appellants submit that the Declaration, Graph 1, and Graph 2 were entered into the record on February 7, 2007 and was addressed by the Examiner in the Office Action dated March 22, 2007 (see page 4 of Office Action dated March 22, 2007, for example).
- 3) Copy of United States Patent and Trademark Office date-stamped postcard filing receipt – entered into record on February 7, 2007.

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**RELATED PROCEEDINGS APPENDIX**

Not applicable.



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**In re Application of**

Takeshi Kamio, et al.

**Serial No.:** 09/987,404

**Group Art Unit:** 1731

**Filed:** November 14, 2001

**Examiner:** John M. Hoffman

**For:** METHOD FOR SINTERING POROUS-GLASS MATERIAL, AND METHOD FOR  
MANUFACTURING PREFORM AND OPTICAL FIBER

**DECLARATION UNDER 37 C.F.R. § 1.132**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

We, Takeshi Kamio and Makoto Yoshida, hereby declare and state:

THAT we are citizens of Japan residing at Gunma-ken Japan;

THAT we graduated from Science University of Tokyo, and Kobe University,  
receiving a Bachelor Degree of Chemistry of Industry, and Master Degree of Chemical Science  
and Engineering, respectively;

THAT we are familiar with the Office Action dated April 19, 2006, where the Examiner  
asserted that Claims 1 and 3-7 are rejected in view of U.S. Patent No. 5,306,322 to Ishikawa and  
that Claims 8, 10-15 and 17 are rejected in view of Ishikawa and U.S. Patent No. 5,306,322 to  
Antos. In particular, where the Examiner maintains that the claimed range for the outer diameter  
(d) of the porous-glass material recited in independent claims 1, 8 and 15 is obvious in view of  
Ishikawa;

THAT we are co-inventors of the above-identified application;

DECLARATION UNDER 37 C.F.R. § 1.132  
U.S. Application No. 09/987,404

With respect to the range recited in the claimed invention, we state and declare that a porous-glass material having an outer diameter  $d$  mm, shown in the table below, and a length of 3000 mm was vitrified using the sintering apparatus (shown in Figure 1 of the present application) in the same method indicated in the Examples of the specification (e.g., see Application at pages 13-16). In performing the test, 50 test pieces (porous-glass material) were used in tests numbers 1-4. The test results are provided in the following table.

Test No.	$d$ (mm)	$D$ (mm)	$D/D$	Number of test pieces of which surface was not damaged.	Number of test pieces of which surface was damaged.	Number of test pieces caused damage to the furnace.
1	350	400	0.88	50	0	0
2	360	400	0.90	50	0	0
3	370	400	0.93	34	16	0
4	380	400	0.95	0	50	3

In the cases where  $d/D < 0.9$  (tests numbers 1 and 2), the surface of the porous-glass material is not damaged even though the porous-glass material rotates and swings to one specific direction in a furnace. This is because a porous-glass material does not contact with a sidewall of the furnace since there is sufficient space between the porous-glass material and the sidewall

DECLARATION UNDER 37 C.F.R. § 1.132  
U.S. Application No. 09/987,404

of the furnace. As shown in the table above, none of the 50 pieces had surfaces that were damaged.

In the cases where  $d/D > 0.9$  (test numbers 3 and 4), a lower part of the surface of a porous-glass material is damaged when the porous-glass material rotates and swings to one specific direction in the furnace. This is because a lower part of the porous-glass material of which a side is not held by a rotation mechanism of the furnace contacts with a sidewall of the furnace, since there is not sufficient space between the porous-glass material and the sidewall of the furnace.

As shown in the table above, in the case where  $d/D = 0.93$  (test number 3, which is the same ratio of  $d/D$  as is disclosed in Ishikawa), 16 test pieces out of 50 resulted in asperity of the surface of the porous-glass material, which was caused by peeling of the surface of the porous-glass material and a broken piece of the damaged portion of the furnace becoming adhered to the surface of the porous-glass material.

Additionally, in the case where  $d/D = 0.95$  (test number 4), all of the 50 test pieces resulted in the same drawback as that of test number 3. Furthermore, in executing the test, the furnace was broken three times by contacting a porous-glass test piece.

Therefore, we disagree with the Examiner's allegation that the claimed range for the outer diameter ( $d$ ) of the porous-glass material recited in independent claims 1, 8 and 15 is obvious in view of Ishikawa.

DECLARATION UNDER 37 C.F.R. § 1.132  
U.S. Application No: 09/987,404

We declare further that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: 23th June, 2006

Date: 29. June, 2006

T. Kamio  
Mr. Takeshi Kamio  
Makoto Yoshida  
Mr. Makoto Yoshida



370-007

SMT/1006

# Attorney's Post Card Filing Receipt

Serial Number: 091 957 401

Papers Filed On: 02/07/07

Attorney's Docket Number: 5H-003705

☒ Patent

☐ Trademark

Applicant's Name: KAMICO, Inc.

Application Filing Date: 11/1/01

Papers Filed Herewith:

☐ Amendment

☒ <sup>Request (1 month)</sup>  
Request for Extension of Time

☐ CPA Request

☐ Notice of Appeal

☐ Appeal Brief (in triplicate)

☐ Reply Brief

☐ IDS

☐ 1449 Form w/ Documents

☐ Priority Document(s)

☐ Assignment

☐ Recordation Cover Sheet

☐ Formal Drawings

☐ Drawing Corrections

☐ Issue Fee Transmittal

☐ Missing Parts

☒ Other Preliminary Amendment, Declaration of Infringement, Request for Extension of Time, etc.

Fees Filed Herewith: \$ 1240 ☐ Check ☐ Charge Deposit Account: \_\_\_\_\_

#1225

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

**In re Application of**

Takeshi Kamio, et al.

**Serial No.:** 09/987,404

**Group Art Unit:** 1731

**Filed:** November 14, 2001

**Examiner:** John M. Hoffman

**For:** METHOD FOR SINTERING POROUS-GLASS MATERIAL, AND METHOD FOR MANUFACTURING PREFORM AND OPTICAL FIBER

**DECLARATION UNDER 37 C.F.R. § 1.132**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

We, Takeshi Kamio and Makoto Yoshida, hereby declare and state:

THAT we are citizens of Japan residing at Gunma-ken Japan;

THAT we graduated from Science University of Tokyo, and Kobe University, receiving a Bachelor Degree of Chemistry of Industry, and Master Degree of Chemical Science and Engineering, respectively;

THAT we are familiar with the Office Action dated September 7, 2006, where the Examiner asserted that Claims 1, 3-7 and 21-25 are rejected in view of U.S. Patent No. 5,306,322 to Ishikawa and that Claims 8, 10-15 and 17 are rejected in view of Ishikawa and U.S. Patent No. 5,306,322 to Antos. In particular, where the Examiner maintains that the claimed range for the outer diameter (d) of the porous-glass material recited in independent claims 1, 8 and 15 is obvious in view of Ishikawa;

THAT we are co-inventors of the above-identified application;



With respect to the range recited in the claimed invention, we state and declare that in accordance with the test results shown in the table below, a glass base material having a low eccentricity error of a core, the value of which is 0.3% or below, can be manufactured in the case where  $d/D > 0.5$  (test numbers 1 to 7, namely, claimed range). On the other hand, in the case where  $d/D < 0.5$  (test numbers 8 and 12, namely, out of claimed range), a glass base material having a relatively high eccentricity error of core is manufactured.

Applicants submit that this evidence supports the description at page 10, line 32 to page 11, line 3 of the specification as filed, such that the predetermined range of the outer diameter (d) of the porous-glass material may be determined so that an eccentricity error of a core inside of the glass base material manufactured by sintering the porous-glass material (e.g., 12) becomes 0.4% or less.

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Test No.	d (mm)	D (mm)	L (mm)	d/D (-)	d/L (-)	Eccentricity error (%)
1	320	400	400	0.800	0.800	0.15
2	280	400	400	0.700	0.700	0.24
3	260	400	400	0.650	0.650	0.30
4	240	400	400	0.600	0.600	0.29
5	220	400	400	0.550	0.550	0.28
6	210	400	400	0.525	0.525	0.29
7	200	400	400	0.500	0.500	0.30
8	190	400	400	0.475	0.475	0.43
9	180	400	400	0.450	0.450	0.75
10	170	400	400	0.425	0.425	0.71
11	160	400	400	0.400	0.400	0.78
12	150	400	400	0.375	0.375	0.83

Accordingly, Applicants submit that claimed invention, including the claimed range ( $0.5 < d/D < 0.9$ ), can clearly provide tremendous advantages such that a glass base material having a low eccentricity error of a core can be manufactured.

Moreover, with respect to the Examiner's position in the Response to Arguments (e.g., see Office Action dated September 7, 2006 at page 6, lines 1-8), Applicants submit that the

claimed range ( $0.5 < d/D < 0.9$ ) of the claimed invention facilitates a design of a porous-glass material sintering apparatus (e.g., 10; see Figure 5 of Application). Specifically, a size of a diameter (D) of a ring heater (e.g., 9), which is suitable for a size of a diameter (d) of the porous-glass material (e.g., 2) can be calculated based on the claimed range (d/D) to prevent the porous-glass material (e.g., 2) from contacting with the sidewall of the furnace (e.g., 5) ( $d/D < 0.9$ ), and to prevent an eccentricity error of the glass base material from increasing ( $d/D > 0.5$ ).

Thus, the apparatus (e.g., 10) can be miniaturized under the condition that a clearance between the porous-glass material (e.g., 2) and the sidewall of the furnace (e.g., 5) become smaller as much as possible. Accordingly, the claimed range (d/D) of the present invention was not accidentally obtained, but was obtained by performing tests to find out a suitable range capable of preventing the porous-glass material from contacting with the sidewall of the furnace, and capable of preventing an eccentricity error of the glass base material from increasing. Based upon this concept, Applicants submit that the Examiner's position is erroneous.

Therefore, we disagree with the Examiner's allegation that the claimed range for the outer diameter (d) of the porous-glass material recited in independent claims 1, 8 and 15 is obvious in view of Ishikawa.

We declare further that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States

DECLARATION UNDER 37 C.F.R. § 1.132  
U.S. Application No. 09/987,404

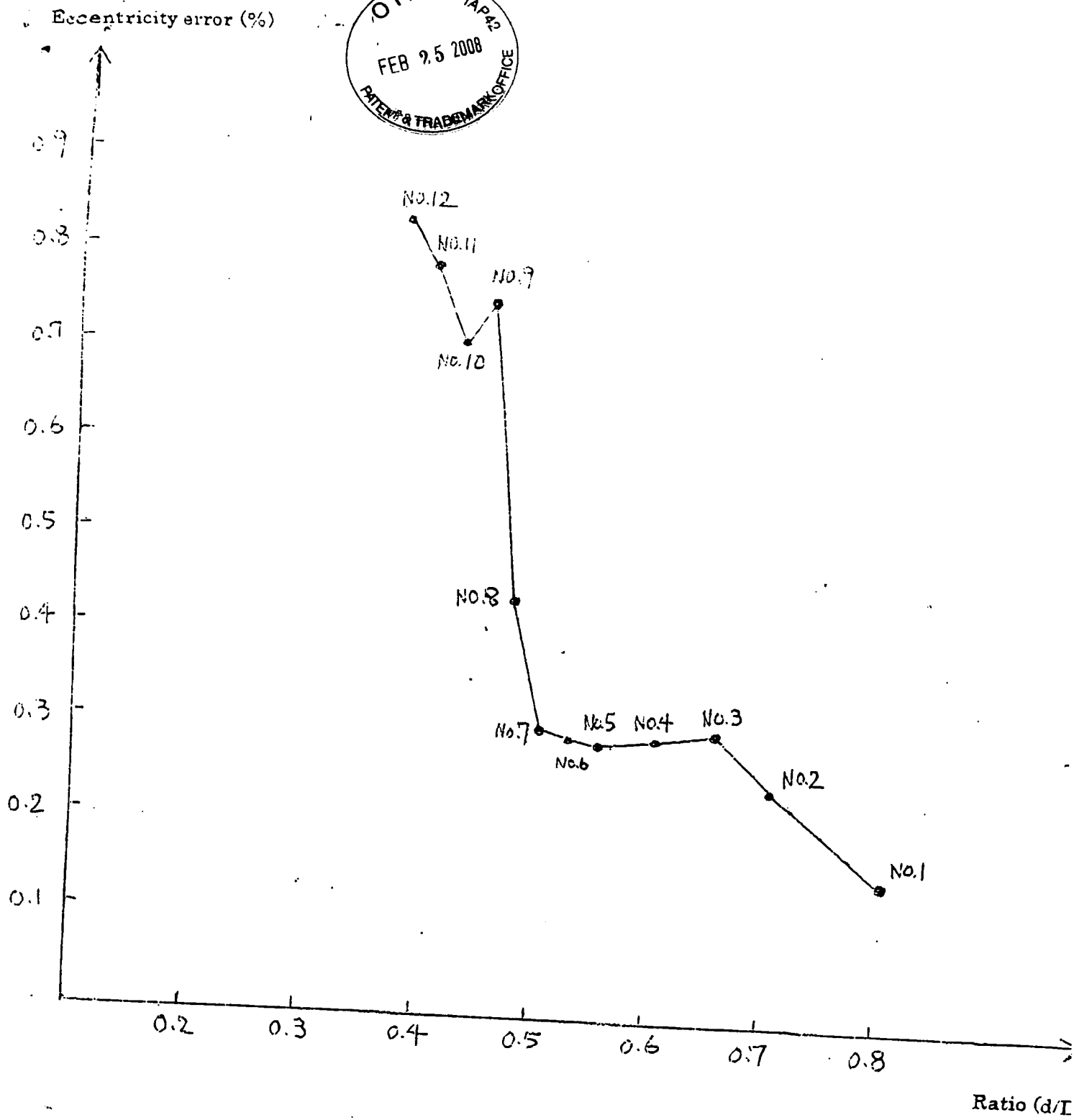
Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: Feb. 7, 2007

Date: Feb. 7, 2007

Takeshi Kamio  
Mr. Takeshi Kamio

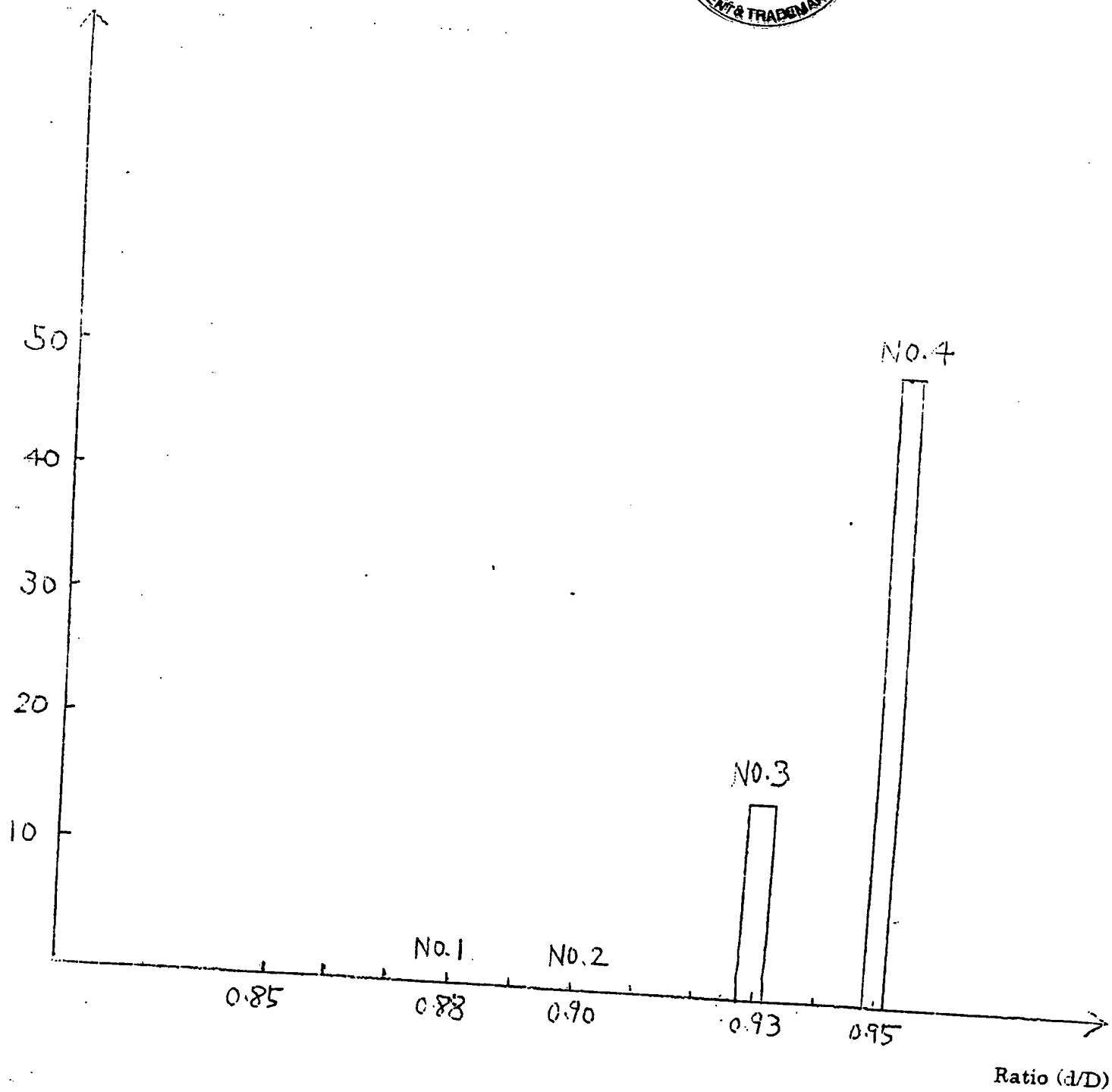
Makoto Yoshida  
Mr. Makoto Yoshida



Graph 1 : Relationship between Eccentricity error and Ratio (d/D)



Number of test piece of which surface was damaged



Graph 2: Relationship between Number of test piece of which surface was damaged and Ratio (d/D)